NORTEL

Product Brief

Nortel Optical Metro 5040/5080 platforms

Product overview

The Optical Metro (OM) 5040 and 5080 are highly-flexible CWDM/DWDM access units that offer the broadest range of broadband services on a compact 1U platform. They extend the value of the Nortel Metro WDM portfolio by delivering a small footprint, low power consumption and a flexible on-ramp to a WDM network. The Optical Metro 5040 and 5080 are typically deployed as Customer Located Equipment (CLE) to support Data Center extension, business services and DSLAM backhaul, access network fiber relief and managed wavelength service delivery over converged CWDM and/or DWDM Wide Area Networks (WANs). The Optical Metro 5040/5080 simplifies multi-protocol service delivery by consolidating complex overlay networks, while increasing network efficiency and lowering Total Cost of Ownership (TCO).

The Optical Metro 5040 and Optical Metro 5080 platforms are equipped with up to four or eight high-speed client service channels respectively, whereby each client channel supports a bit rate range from 125 Mbps to 4.25 Gbps. Both the client side and line side interfaces are Small Form-factor Pluggable (SFP) optical transceivers for a "pay-as-you-grow" service architecture and are fully replaceable for simplified maintenance. Each service port is independently provisioned, managed and monitored using the web-based management interface.

In either transponder (Figure 1) and/or regenerator (Figure 2) setup modes, both the Optical Metro 5040 and 5080 have the flexibility to support point-to-point, linear ADM, hub and spoke, and ring topologies with multiple protection schemes. The Optical Metro 5040/5080 platforms are designed to meet the service provider and enterprise requirements of today, with the agility to scale as service requirements evolve.

Figure 1. Optical Metro 5040/5080 – 8-channel CWDM/DWDM Transponder

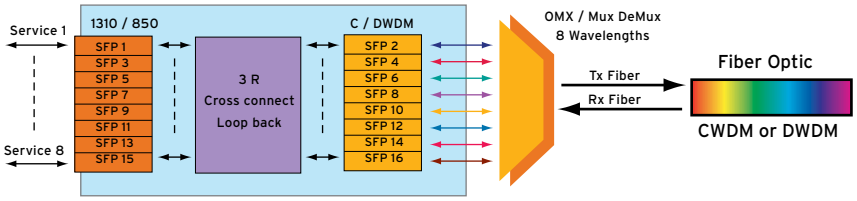
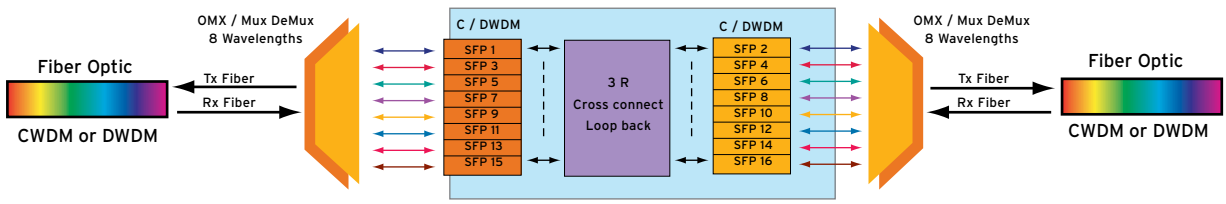


Figure 2. Optical Metro 5040/5080 – 8-channel CWDM/DWDM Regenerator



New Release 2.0 improves price, footprint and functionality

Release 2.0 of the Optical Metro 5040/5080, introduced in Q3 2009, offers a software upgrade for the Advanced hardware platform that supports 4 X Gigabit Ethernet (GE) muxed into a 4.25Gbps wavelength. This allows both platforms to achieve lower GE transport costs, greater spectral efficiency and higher service density. Now, using an Optical Metro 5040 to transport 4 GE services (see Figure 3) requires just one line side SFP, as opposed to four previously, and does not require an optical multiplexer (OMX). With the addition of only a line side SFP, the 4 x GE can be optionally protected from fiber cuts by sending the 4Gbps signal down two separate fibers. The ports on the Optical Metro 5040 and Optical Metro 5080 which have been freed up by use of the multiplexing feature can be used to carry additional services, which can be from the full supported range of 125M - 4.25Gbps, thereby increasing density.

The GE muxing capability is purchased as a license key to unlock either one mux group (4x GE) (Optical Metro 5040 and Optical Metro 5080) or two mux groups (two separate 4 x GE ports, Optical Metro 5080 only).

In addition, inband communications over GE wavelengths is supported to eliminate the requirement for Optical Supervisory Channel (OSC) wavelengths. This new feature can be enabled on single GE wavelengths and is 100 percent out of band so that it consumes no bandwidth from the client signal. The inband communications feature also operates over the muxing feature (if enabled) to carry communications over the 4.25Gbps muxed signal on the line side.

The Optical Metro 5040 and Optical Metro 5080 uniquely offer the ability to deploy a single platform for transponder applications for protocols up to 4.25Gbps, and remotely reconfigure via license key to enable both muxing and transponder functions on the same 1U platform utilizing only SFPs. This reduces sparing costs by 50 percent compared to solutions that offer separate transponder and muxing modules, and thus contributes significantly to OPEX savings.

Applications for service providers and enterprises

Service providers

- Low-cost access network fiber relief
- Demarcation for managed wavelength services and converged access
- GE business services and DSLAM backhaul
- Hosted services connectivity (Data Center, IP VPN, VoIP and PBX)

Enterprise

- Data Center connectivity transformation
  - SAN/LAN consolidation
  - IT centralization
- WAN convergence
  - Campus or metro bandwidth aggregation
  - Collapse costly and complex overlay networks

Deploying the Optical Metro 5040 and Optical Metro 5080

- Deploy in point-to-point, chain, linear ADM, hub and spoke, and ring topologies
- Connect 1G/2G/4G Fiber Channel and FICON, ESCON, Fast Ethernet, Gigabit Ethernet, 1000BaseT, OC-3/STM-1, OC-12/STM-4 and OC-48/STM-16 in any mix via Pluggable SFP Client Interface for Client

Figure 3. Muxponder and inband comms panel for Optical Metro 5040 and Optical Metro 5080

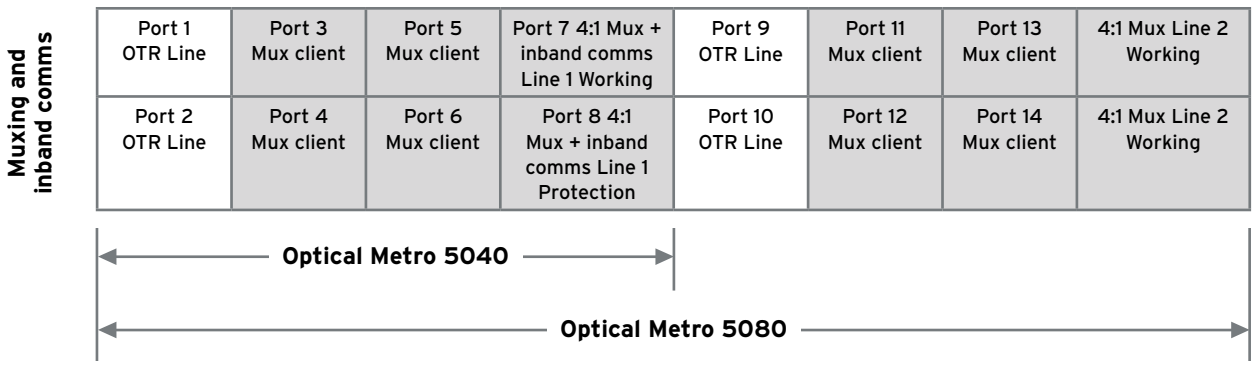

Muxing and inband comms
Port 1 OTR Line
Port 3 Mux client
Port 5 Mux client
Port 7 4:1 Mux + inband comms Line 1 Working
Port 9 OTR Line
Port 11 Mux client
Port 13 Mux client
4:1 Mux Line 2 Working
Port 2 OTR Line
Port 4 Mux client
Port 6 Mux client
Port 8 4:1 Mux + inband comms Line 1 Protection
Port 10 OTR Line
Port 12 Mux client
Port 14 Mux client
4:1 Mux Line 2 Working
Optical Metro 5040
Optical Metro 5080

Figure 4. Optical Metro 5080

1. Power Indicator	7. Craft LAN Port
2. Up to 8 SFP Transponder Ports	8. External RS 232 Alarms Port
3. Link Indicators	9. Craft RS 232 Port
4. OSC Ports	10. AC/DC Power Supply A (shown empty)*
5. Status Indicators	11. AC/DC Power Supply B (DC shown)*
6. Equipment Portection Expansion Port	12. Fan Unit

* Supports simultaneous AC and DC power configurations on the same platform.

- Connect WDM channels via Pluggable SFP Interface
- Configure each service independently through the user-friendly web-based management tool
- Remotely manage, monitor and maintain the Optical Metro 5040/5080 network through:
  - Optical Metro 5040/5080 HTTP Craft Interface
  - Dedicated Optical Supervisory Channels
  - TL1 interface
  - SNMP V2c and SNMP V1 traps
  - Nortel OMEA (Optical Metro Element Adapter) Management Integration

Getting started with the Optical Metro 5040 and Optical Metro 5080

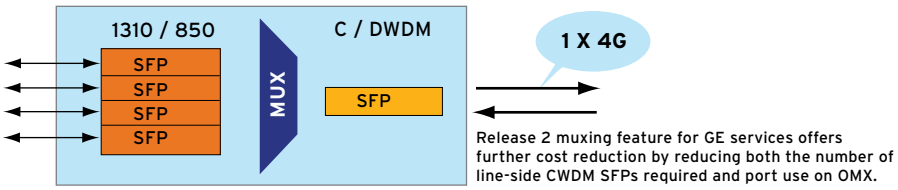
Get started with:

- Two 1U Optical Metro 5040 platforms in a point-to-point solution (add additional platforms for linear ADM, hub and spoke, or ring configurations) to deliver:
  - Access to and transportation of up to four high-speed (125 Mbps - 4.25 Gbps) services — storage, data and voice — in any mix, over a single fiber pair
- Two 1U Optical Metro 5080 platforms in a point-to-point solution (add additional platforms for linear ADM, hub and spoke, or ring configurations) to deliver:
  - Access to and transportation of up to eight high-speed (125 Mbps - 4.25 Gbps) services — storage, data and voice — in any mix, over a single fiber pair

Key features

- 4 x GE muxing into 4Gbps line side wavelength for higher density and lower costs (see Figure 4)
- Inband communications remove OSC wavelength costs and simplify remote NE management
- DS3 WAN SFP solution for GE client protocol
- Single fiber client side SFPs for GE extension to customer sites over single fibers to reduce fiber exhaust
- 4-channel and 8-channel CWDM OMX with integrated 1310 nm OSC port
- CWDM or DWDM transport and aggregation of storage, data and voice applications
- Pay-as-you-grow architecture for up to 8 WDM channels over a single fiber pair
- Pluggable SFP interface for both service and WDM channels, allowing maximum flexibility as well as ease of maintenance and operation
- Multi-protocol support
- 1G/2G/4G FC and FICON, ESCON, Fast Ethernet, GbE, STM-1/OC-3, STM-4/OC-12 and STM-16/OC-48
- Client bit rate range from 125 Mbps to 4.25 Gbps at 850,1300 or 1500nm
- Transponder and/or Regenerator modes with common Optical Metro 5100/5200 OMX support
- Colorless Regeneration (Match any client to any line interface without restrictions)
- Point-to-point, chain, linear ADM, hub and spoke, and ring topology support
- Optical Metro 5100/5200 and Optical Metro 6500 shared ring and head-end topology support
- Remote management via dedicated protected or unprotected OSC
- Graphical topology display using OSC discovery protocol
- Multi-box stacking for simplified management at remote sites
- Optional advanced platform that adds enhanced performance monitoring for GE, FC and SONET/SDH
- Supports facility protection schemes and loop backs
- Pluggable FAN module with removable FAN tray
- Dual AC or DC power supply configurations

Figure 4. Muxing 4xGE into 1x4G



Release 2 muxing feature for GE services offers further cost reduction by reducing both the number of line-side CWDM SFPs required and port use on OMX.

Optical Metro 5040 and 5080 feature comparison

	Optical Metro 5040	Optical Metro 5080
Size	1U	1U
Number of WDM channels	4	8
Muxing of GE	Yes – advanced platform	Yes – advanced platform
Unprotected Max Density with muxing	5 GE over 2 wavelengths, or 4 GE and any other protocol over 2 wavelengths	10 GE over 4 wavelengths or 8 GE and 2 of any other protocol over 4 wavelengths
Protected Max Density with muxing	5 GE (4 protected GE) over 3 wavelengths, or 4 GE protected and 1 unprotected protocol over 3 wavelengths	10 GE (8 protected) over 6 wavelengths or 8 GE protected and 2 unprotected protocols over 6 wavelengths
CWDM Transport	Yes	Yes
DWDM Transport	Yes	Yes
3R (Re-amplification, Re-shaping and Re-timing)	Yes	Yes
Point-to-point, chain, linear ADM, hub, spoke and ring configurations	Yes	Yes
Pluggable SFP Client Interfaces	Yes	Yes
Pluggable SFP WAN Interfaces	Yes	Yes
Client Fiber Support	Multi Mode / Single Mode	Multi Mode / Single Mode
1G/2G/4G Fibre Channel	Yes	Yes
1G/2G/4G FICON	Yes	Yes
ESCON	Yes	Yes
Fast Ethernet	Yes	Yes
GbE	Yes	Yes
1000 BaseT	Yes	Yes
STM-1/OC-3	Yes	Yes
STM-4/OC-12	Yes	Yes
STM-16/OC-48	Yes	Yes
DS3 WAN solution	Yes	Yes
Single fiber GE client SFPs	Yes	Yes
Optical Supervisory Channel (OSC) Management	Yes	Yes
OSC Graphical Topology	Yes	Yes
Craft Terminal Interface	Yes	Yes
Command Line Interface (CLI)	Yes	Yes
TL1 Interface	Yes	Yes
SNMP V2c and SNMP V1 Traps	Yes	Yes
Basic Performance Monitoring	Yes	Yes
Advanced Performance Monitoring	Yes	Yes
Facility Protection	Yes	Yes
Path Protection	Yes	Yes
Optical Metro 5100/5200 Inter-working	Yes	Yes
Optical Multiservice Edge 6500 Inter-working	Yes	Yes
Multi-Box Stacking at Remote Site	Yes	Yes
Dual AC/DC Power Supply	Yes	Yes
Pluggable FAN modules	Yes	Yes
CWDM Power Consumption	42 W	54 W
DWDM Power Consumption	45 W	60 W

Technical specifications

Description

- Fixed 4 client ports platform configuration

Physical dimensions

Height: 1.77" (1 RU) / 45 mm
Width: 17.32"/ 440 mm
Depth: 9.05"/ 230 mm

Ordering codes

NTPM70AAE5	OM5040 Chassis - Basic PM
NTPM70MAE5	OM5080 Chassis - Basic PM
NTPM71AAE5	OM5040 Chassis - Advanced PM
NTPM71MAE5	OM5080 Chassis - Advanced PM
NTPM75BAE5	OM5040 Chassis Basic PMs, Rel 2.0 SW, Fan module
NTPM76BAE5	OM5040 Chassis Advanced PMs, Rel 2.0 SW, Fan module
NTPM75NAE5	OM5080 Chassis Basic PMs, Rel 2.0 SW, Fan module
NTPM76NAE5	OM5080 Chassis Advanced PMs, Rel 2.0 SW, Fan module

System

- **Topology:** Point-to-point, chain, linear ADM and ring, subtending access to core C/DWDM networks
- **Transport network/medium:** C/DWDM and dark fiber
- **Approvals:** CE Class B, FCC, RoHS 5/6
- **Software upgrade:** Traffic hitless - dual image
- **Protection:** Facility

Standards

Safety

- For DC-powered (telco) products, the product is required to maintain basic insulation between the -48V battery and ground as specified in CSA 22.2 No. 60950-1/UL 60950-1
- IEC 60950-1; with all country deviations
- CSA C22.2 No. 60950-1
- UL 60950-1
- EN 60950-1:2000+A11:2004
- EN 60825-1:1994+A2:2001+A1:2002 (for products containing optical sources)
- EN 60825-2:2004 (for products containing optical ports)

Technical specifications – continued

Environmental

Market	Standard
EMEA and ROW for Telecom Centers and controlled environments	• ETSI EN 300 019-1-3 class 3.2 • ETSI EN 300 019-1-2 class 2.3 • ETSI EN 300 019-1-1 class 1.2
North America [Rn.n]	GR-63-CORE, Issue 3 (Design Objective) • Zone 4 earthquake criteria • Indoor contaminant levels (airborne contaminants) GR-78-CORE, Issue 2 (Design Objective) Verizon TPRs (Design Objective) as applicable see: http://www.verizonnebs.com/tpr.html

- Normal operating temperature: 0°C to 50°C
- Storage temperature: -25°C to 55°C
- Normal operating humidity: 5% to 85% RH
- Storage humidity: Up to 95% RH

EMC

Attribute	Test method / pertinent specifications
Radiated Emissions: "Class A" (with 6 dB margin, objective)	• ICES-003, Issue 4 • EN 300 386 V1.3.3 • EN 55022:2006 • FCC Part 15 Subpart B • GR-1089-CORE, Issue 4 (Design Objective)
Conducted Emissions: "Class A" (with 3 dB margin, objective) (Power and Signal Cables)	• EN 300 386 V1.3.3 • EN 55022:2006 • GR-1089-CORE, Issue 4 (Design Objective)
Radiated RF Immunity	• EN 300 386 V1.3.3 (other than telecommunications centers criteria) • EN 55024:1998+A1:2001+A2:2003 • GR-1089-CORE, Issue 4 (Design Objective)

Product options

- OM 5040 3R Transponder Mode: Up to 4 CWDM or DWDM transponders
- OM 5080 3R Transponder Mode: Up to 8 CWDM or DWDM transponders
- Colorless Regeneration (Match any client to any line interface without restrictions)
- Optical Multiplexers (OMX) support:
  - OMX 4CH DWDM 200 GHz
  - OMX 16CH DWDM
  - OMX 4CH ITU CWDM
  - OMX 8CH ITU CWDM
  - OMX 4CH OADM ITU CWDM

CWDM link

- Wavelengths: CWDM SFPs are supported with CWDM ITU OMX
  - 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611 nm (20nm spacing)
- Approvals: CE Class B, FCC, RoHS 5/6
- Optical supervisory channel: 1310 nm
- Optical reach: 80Km for 2.66 Gbps, 80 Km for 4.25 Gbps
- Optical power output: 0 to 5 dBm
- Sensitivity: -28 dBm APD
- Optical monitoring: Tx and Rx power

DWDM link

- Wavelengths: DWDM SFPs are supported with 200 GHz DWDM OMX
  - Band 1: 1528.77, 1533.47, 1530.33, 1531.90 nm
  - Band 2: 1538.19, 1542.94, 1539.77, 1541.35 nm
  - Band 3: 1547.72, 1552.52, 1549.32, 1550.92 nm
  - Band 4: 1557.36, 1562.23, 1558.98, 1560.61 nm
- Optical supervisory channel: 1510 nm
- Optical reach: 180Km for 2.66 Gbps, 80 Km for 4.25 Gbps
- Optical power output: 0 to +4 dBm
- Sensitivity: CE -28 dBm APD
- Optical monitoring: Tx and Rx power

Services

- Interface rates: 125 Mbps up to 4.25 Gbps
- Optical interface: 1310nm / 850nm / 15xy nm (C/DWDM)
- Optical Transparent Services: 1G/2G/4G FC and FICON, ESCON, Fast Ethernet, GbE, STM-1/OC-3, STM-4/OC-12, STM-16/OC-48 (Any Mix)
- Copper Transparent Services: 1000 BaseT

Network management

- Local management ports: 10/100BT RJ-45, RS-232 DB-9
- Protocols: SNMP, FTP, HTTP WEB server, TL-1
- DCN: LAN/WAN/VPN
- Management: Web-based craft interface and OMEA (Optical Manager Element Adapter) support
- OAM: PM counters for FC and GbE services based on 8b/10b coding violations: CV, ES, SES and UAS
  - PM counters for SONET and SDH services based on B1 coding violations: RS-BBE, RS-ES, RS-SES, RS-OFS SES
  - Loop backs (client and line side)
  - Event logger
  - Alarms
- Management channel: In-band OSC (100FX) and out-of-band Ethernet IP
- Visual indicators: LED status indicators for client ports, line interfaces, power and shelf

Power supply

Characteristics:

- AC: 90 to 264 V AC, 50/60Hz
- DC: Operation range is -40 to -75 V DC
- Redundancy: Single or dual feeding hot pluggable)
- Operating temperature: 0°C to 50°C
- Maximum power consumption: 60W (measured populated with DWDM OC-48 SFPs)

Fans

- Removable cooling units
- Dimension 204 mm x 32 mm x 20 mm
- Flow1.14 Cubic meter/minute (4 fans 0.286 m3/min each)
- Hot-pluggable

Environmental alarms and visual indicators

- One input and one output environmental and office alarm
- Three system – level LEDs for Critical, Major and Minor alarm indications

Mounting options

- 19", ETSI and 23" Rack Mountable

In the United States:
Nortel
35 Davis Drive
Research Triangle Park, NC 27709 USA

In Canada:
Nortel
195 The West Mall
Toronto, Ontario M9C 5K1 Canada

In Caribbean and Latin America:
Nortel
1500 Concorde Terrace
Sunrise, FL 33323 USA

In Europe:
Nortel
Maidenhead Office Park, Westacott Way
Maidenhead Berkshire SL6 3QH, UK
Email: euroinfo@nortel.com

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Singapore 307591
Phone: (65) 6287 2877

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